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ABSTRACT

The multidisciplinary clinic model for diagnosis and remediation of learning disabilities (LD) in use at Auburn University's Montgomery Learning Disability Clinic is based on an information processing model. Thirty-seven process and academic skills were isolated tests to measure the skills identified, and a computer program to profile strengths and weaknesses developed. A flow chart of clinic activities starts with referral to the clinic proceeds through appropriate forms sent to and completed by the parents, to culmination at a parent/staff conference. Samples of forms and printouts are included. (CL)

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A COMPUTERIZED DIAGNOSTIC/PRESCRIPTIVE LEARNING DISABILITY CLINIC MODEL-- A UNIVERSITY-BASED, MULTI-DISCIPLINARY APPROACH

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A COMPUTERIZED DIAGNOSTIC/PRESCRIPTIVE LEARNING DISABILITY CLINIC MODEL--

A UNIVERSITY-BASED, MULTI-DISCIPLINARY APPROACH

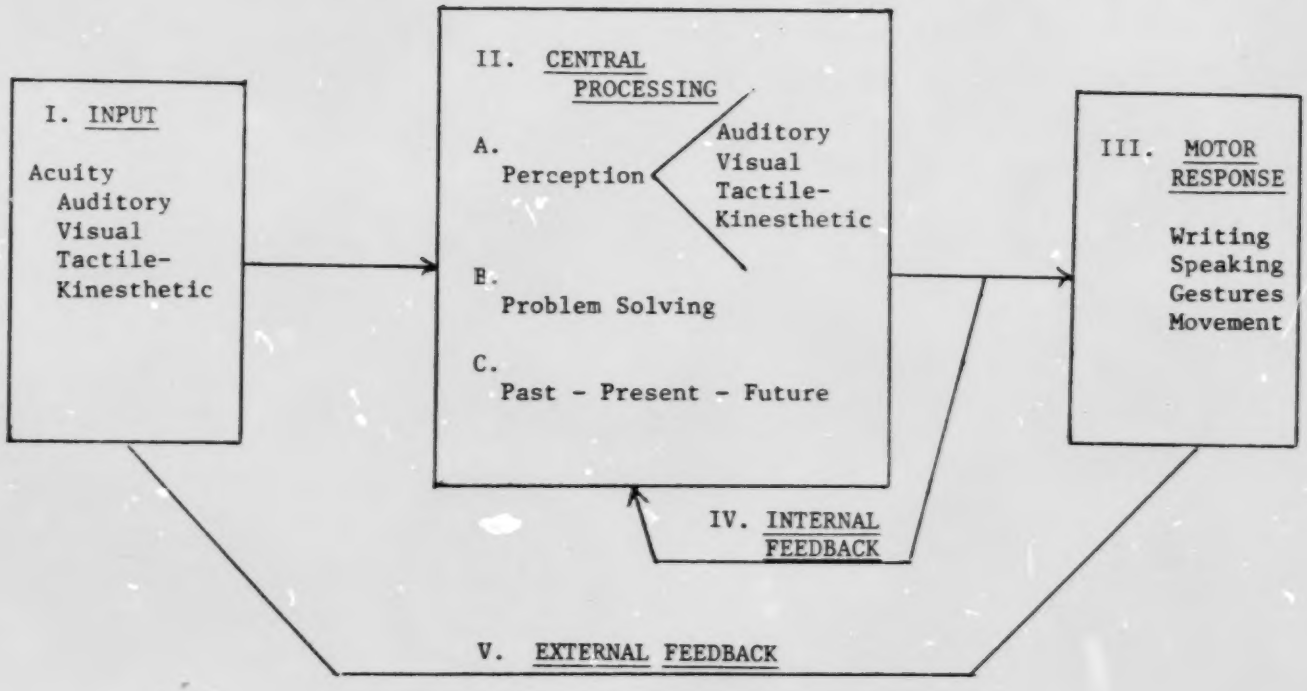
Larry L. Martin, Ph.D.
and
Therese M. Graham, Ed.S.

The purpose of this presentation is to demonstrate the fully operational multi-disciplinary (psychological, educational, and medical) clinic model for the diagnosis and remediation of children with learning disabilities. This model is being utilized within the Auburn University at Montgomery Learning Disability Clinic. The presentation will be broken into two major parts--The Theory and The Application.

The Theory

In order to further explain the concept of learning disabilities, one must theorize as to how humans process information and, also, how they learn. Figure 1 displays schematically how it is believed humans process information. Position I (Input) deals with the acuities most commonly used in the school setting--auditory, visual, and tactile-kinesthetic. Auditory acuity refers to the levels of ability of the ears to send "sounds" or auditory stimuli in the form of electrical impulses into the central nervous system. Likewise, visual acuity refers to the levels of ability of the eyes to send "sights" or visual stimuli in the form of electrical impulses into the central nervous system. Tactile-kinesthetic acuity, therefore, refers to the levels of ability of the receptive nerve endings (the sense of touch and the use of proprioceptors within the muscular system) to send "physical sensations" or tactile-kinesthetic stimuli in the form of electrical impulses into the central nervous system.

INFORMATION PROCESSING MODEL*
Figure 1



*Adapted from Newell C. Kephart, The Slow Learner in the Classroom, (Columbus, Ohio: Charles E. Merrill Publishing Company, 1971), p. 108.

Position II (Central Processing) deals with what happens to the input stimuli when it reaches the central nervous system which is composed of the brain and the spinal cord. Auditory, visual, and tactile-kinesthetic perception abilities are alluded to in Position II A. Position II B represents the problem solving processes of the central nervous system. Position II C alludes to how the organism utilizes past learning (memories) to deal with the present learning task and plan for future events or happenings. All "thinking" and signals for muscular innervation take place in the central nervous system.

Position III (Motor Response) deals with the end result of all school related work--write down the answer, tell the answer, make body gestures in response to a problem or perform some type of movement in response to a command. It should be noted that student abilities are evaluated by observing the nature of elicited motor responses. Through careful examination of these responses, we can only "infer" the existence of intra-child strengths and weaknesses.

Position IV (Internal Feedback) refers to the process of "checking" an answer before a motor response has taken place. If, on the other hand, a motor response has already taken place, this self-checking is referred to as External Feedback and is represented at Position V.

A simple example as to how the information processing model works is presented below:

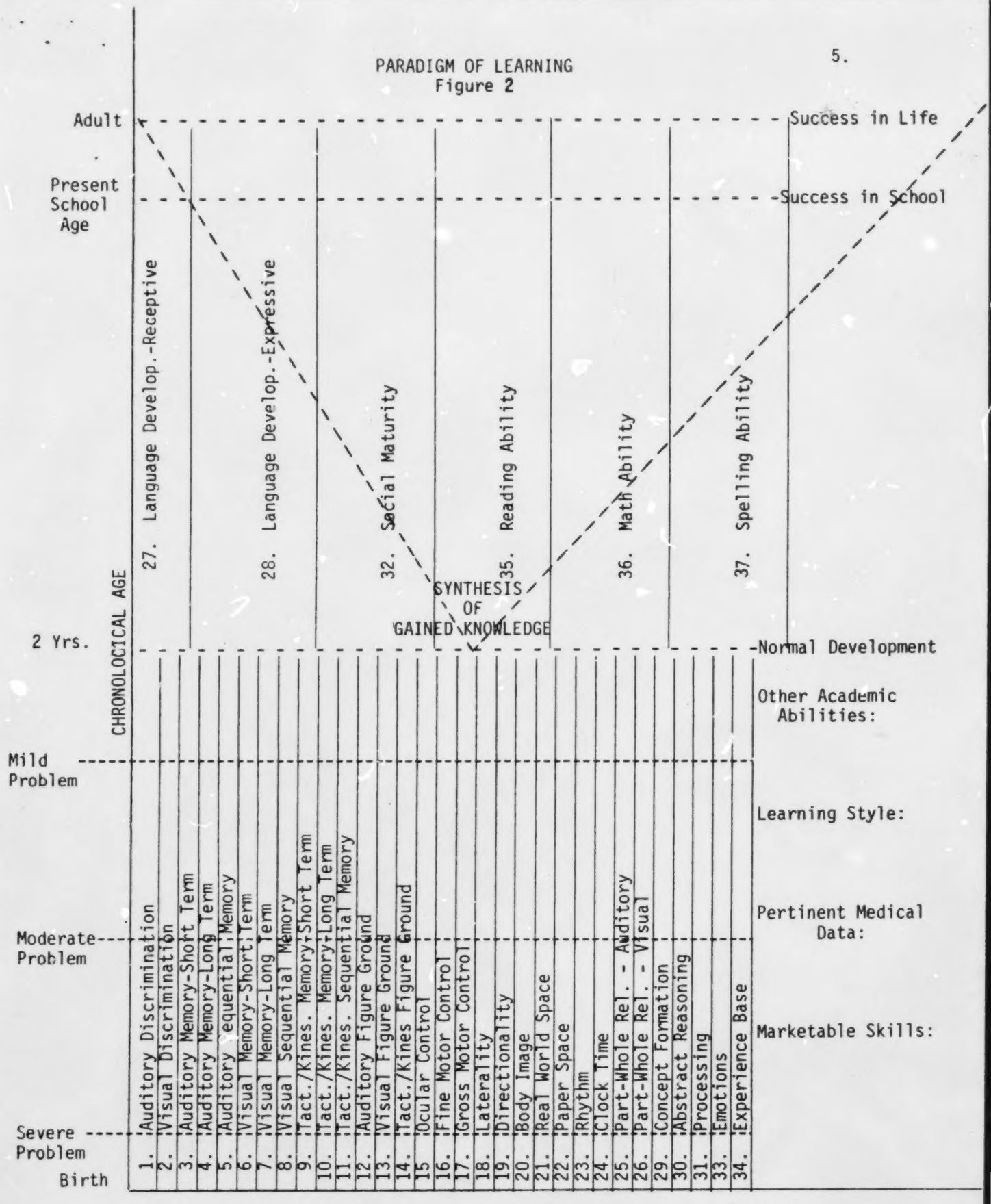
> The teacher asks a child to raise the right hand. The child listens (auditory acuity) in order to translate sounds into electrical stimuli (Input). These stimuli are received in the central nervous system (Central Processing). Here auditory perceptual abilities translate these stimuli. Utilizing his/her problem solving abilities and memories, the child determines how to respond. At this point the child utilizes the Internal Feedback mechanism to check the answer before initiating a motor response. Once checked, the child initiates a Motor

Response to satisfy the teacher's request. In this case, the child raises the correct hand. Once this movement (Motor Response has taken place, the child uses the External Feedback mechanism to validate the response.

If correct responses are habitually received from a child, one may assume that the child is learning what is being taught. If, however, a student habitually gives incorrect responses, the entire information processing system must be scrutinized for possible functional breakdowns. Input must be checked immediately, to see of the child can "see," "hear," or "feel" correctly. The Motor Response area must be checked also, to see if the child has the fine and/or gross motor abilities necessary to physically respond to the task. If the student displays adequate functioning in the Input and Motor Response areas, yet incorrect responses continue, the next step is to make inferences about the Central Processing abilities of the central nervous system by "going inside." This "going inside" is represented by the Paradigm of Learning, (Figure 2) which is presented graphically to display how a child learns and the areas to be examined when a breakdown in learning takes place.

The Paradigm of Learning (Figure 2) was designed to be compatible for computer usage. Thirty-seven process and academic skills were identified as being essential for proper learning to take place. These process abilities and academic skills were individually defined. In addition, two remediation activities for each of the 37 skill areas were developed. They were broken down into activities suitable for grades N-K; 1, 2, and 3; 4, 5, and 6; 7, 8 and 9; and 10, 11 and 12. Also developed was an appropriate general learning approach for the student experiencing problems in any of the 37 skill areas and what school activities might also be affected if a child has a problem in any one area.

PARADIGM OF LEARNING
Figure 2



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Learning Disability Clinic

Once these thirty-seven skill areas were isolated, the next step was to identify a battery of tests that would provide multiple measures of each area and to develop a computer program that would utilize the test scores to identify possible strengths and weaknesses reflected by them. These steps are reflected in the next section of this presentation.

The Application

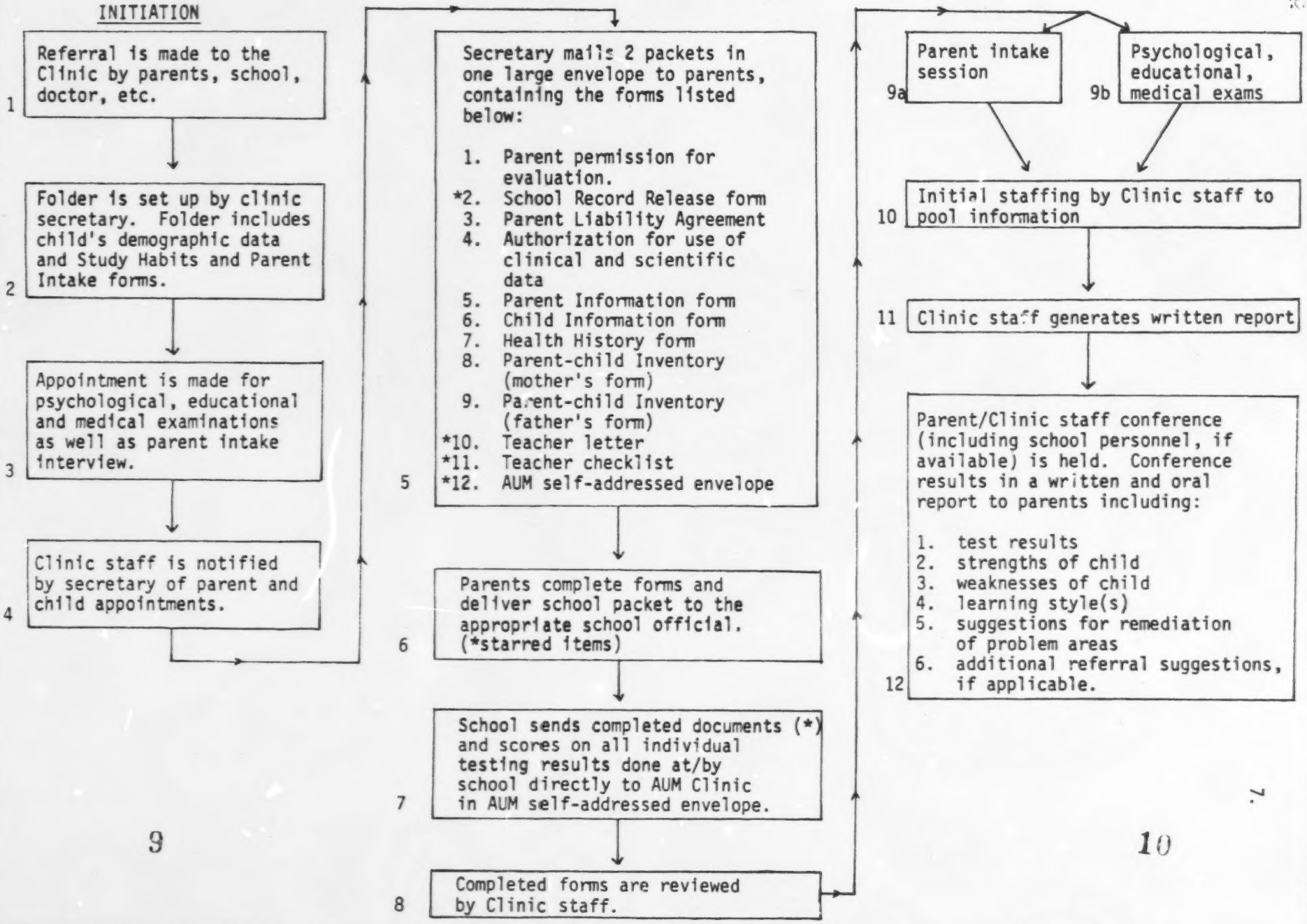
The first step in the application process was to set up the clinic procedures necessary to try out the developed model. See Figure 3 for the flow chart of activities that were developed for this purpose. The information generated in steps 9a and 9b (the comprehensive educational, psychological, medical examinations and the information gathered in the parent intake session) is consolidated and graded. The tests utilized for this are listed on page 8, Summary of Test Results. These results are then entered on computer sheets to be key punched (See page 9 for a sample page.).

The child's scores are punched upon computer cards and processed through a computer program that prints out his/her strengths and weaknesses on 37 skill areas that are deemed necessary for success in school. (See page 10 for an example of this printout.)

The computer printout is utilized by the director, psychologist, diagnostician, counselor, and pediatrician to pinpoint areas of strengths and weakness. When the staff determines the child's weak areas, another computer program generates the definition of each weakness, how this weakness affects school performance, the general learning approach to use, two grade appropriate teaching activities for each weakness, and where to go for additional information and help. (See pages 11 and 12 for examples.)

AUM LEARNING DISABILITY CLINIC FLOW CHART OF ACTIVITIES

Figure 3


INITIATION
1 Referral is made to the Clinic by parents, school, doctor, etc.
2 Folder is set up by clinic secretary. Folder includes child's demographic data and Study Habits and Parent Intake forms.
3 Appointment is made for psychological, educational and medical examinations as well as parent intake interview.
4 Clinic staff is notified by secretary of parent and child appointments.
5 Secretary mails 2 packets in one large envelope to parents, containing the forms listed below:
1. Parent permission for evaluation.
*2. School Record Release form
3. Parent Liability Agreement
4. Authorization for use of clinical and scientific data
5. Parent Information form
6. Child Information form
7. Health History form
8. Parent-child Inventory (mother's form)
9. Parent-child Inventory (father's form)
*10. Teacher letter
*11. Teacher checklist
*12. AUM self-addressed envelope
6 Parents complete forms and deliver school packet to the appropriate school official. (*starred items)
7 School sends completed documents (*) and scores on all individual testing results done at/by school directly to AUM Clinic in AUM self-addressed envelope.
8 Completed forms are reviewed by Clinic staff.
9a Parent intake session
9b Psychological, educational, medical exams
10 Initial staffing by Clinic staff to pool information
11 Clinic staff generates written report
12 Parent/Clinic staff conference (including school personnel, if available) is held. Conference results in a written and oral report to parents including:
1. test results
2. strengths of child
3. weaknesses of child
4. learning style(s)
5. suggestions for remediation of problem areas
6. additional referral suggestions, if applicable.

AUBURN UNIVERSITY AT MONTGOMERY #00000
LEARNING DISABILITY CLINIC
Larry L. Martin, Ph.D., Director 8.

SUMMARY OF TEST RESULTS

NAME:
PARENT:
ADDRESS:

GRADE:
SCHOOL:

SEX:
CHRON. AGE:
BIRTH DATE:
TEST DATE:

Associate Professor/Learning Disabilities

PEABODY PICTURE VOCABULARY TEST

Raw Score:
Standard Score:
Percentile:
Stanine:
Age Equivalent:

BEERY-BUKTENICA

ALPHABET & NUMBERS

DRAW-A-PERSON

WOODCOCK READING MASTERY--Form B

Overall Reading Ability:
See Profile.

BENDER

Koppitz Score of
_____ yrs. old

DVORINE COLOR PLATES

KEY MATH

Overall Math Ability:
See Profile.

WEPMAN AUDITORY DISCRIMINATION TEST

X = Y =

WIDE RANGE ACHIEVEMENT TEST

Psychologist/Psychometrist

WISC-R

Verbal Scale:
Performance Scale:
Full Scale:
Mental Age:

Verbal Tests

Information
Similarities
Arithmetic
Vocabulary
Comprehension
Digit Span

Performance Tests

Picture Completion
Picture Arrangement
Block Design
Object Assembly
Coding
Mazes

PUPIL BEHAVIOR RATING SCALE

Audit. Comp. & Listen.
Spoken Language
Orientation
Behavior
Motor

OCULAR CONTROL

DETROIT TEST OF LEARNING APTITUDE
-or-
ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES

LEARNING DISABILITY CLINIC
AUBURN UNIVERSITY AT MONTGOMERY
Larry L. Martin, Ph.D., Director

SUMMARY OF TEST RESULTS AND RATING OF PERFORMANCE

IDENT. NUMBER: 0 0 0 4 1 (NAME SUPPLIED AFTER PRINTING)
(1) (2) (3) (4) (5)

GRADE: 0 1.7
(6) (7) (8)

DATES OF TESTING: 0 3/1 9, 2 4, 0 0/8 0
(9) (10) (11) (12) (13) (14) (15) (16) (17) (18)

DATE OF BIRTH: 0 8/2 8/7 3
(19) (20) (21) (22) (23) (24)

CHRONOLOGICAL AGE: 0 6 YRS. 0 6 MOS.
(25) (26) (27) (28)

REFERRED BY: (29) SCHOOL X (30) PARENT (31) OTHER

SCHOOL: (NAME SUPPLIED AFTER PRINTING)

ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES

	AGE* SCORE	SCALED SCORE	RATING
AUDITORY RECEPTION	0 6 YRS 0 3 MOS (32 33 34 35)	3 6 (36 37)	2 (38)
VISUAL RECEPTION	0 7 YRS 0 1 MOS (39 40 41 42)	4 0 (43 44)	2 (45)
VISUAL MEMORY	0 7 YRS 1 0 MOS (46 47 48 49)	4 2 (50 51)	2 (52)
AUDITORY ASSOCIATION	0 6 YRS 0 2 MOS (53 54 55 56)	3 4 (57 58)	2 (59)
AUDITORY MEMORY	0 4 YRS 0 8 MOS (60 61 62 63)	2 9 (64 65)	3 (66)
VISUAL ASSOCIATION	0 5 YRS 0 0 MOS (67 68 69 70)	2 8 (71 72)	3 (73)
VISUAL CLOSURE	0 5 YRS 0 8 MOS (74 75 76 77)	3 1 (78 79)	2 (80)
VERBAL EXPRESSION	0 7 YRS 0 8 MOS (1 2 3 4)	4 2 (5 6)	2 (7)
GRAMMATIC CLOSURE	0 5 YRS 0 8 MOS (8 9 10 11)	3 1 (12 13)	2 (14)
MANUAL EXPRESSION	0 7 YRS 0 6 MOS (15 16 17 18)	3 9 (19 20)	2 (21)
AUDITORY CLOSURE	0 6 YRS 0 1 MOS (22 23 24 25)	3 5 (26 27)	2 (28)
SOUND BLENDING	0 8 YRS 0 7 MOS (29 30 31 32)	4 9 (33 34)	1 (35)
OVERALL PSYCHOLINGUISTIC AGE	0 6 YRS 0 4 MOS (36 37 38 39)		
MEDIAN SCALED SCORE	3 5 (40 41)		
MEAN SCALED SCORE	3 5 (42 43)		

*IF 99 YRS. 99 MOS. APPEARS, AGE SCORE IS OVER TOP OF NORMS.

*IF 00 YRS. 00 MOS. APPEARS, AGE SCORE IS OFF BOTTOM OF NORMS.

WECHSLER INTELLIGENCE SCALE FOR CHILDREN - REVISED

VERBAL INTELLIGENCE QUOTIENT 1 0 6 (44 45 46)

PERFORMANCE INTELLIGENCE QUOTIENT 1 1 2 (47 48 49)

FULL SCALE INTELLIGENCE QUOTIENT 1 0 9 (50 51 52)

MENTAL AGE 0 7 YRS 0 1 MOS (53 54 55 56)

VERBAL TESTS

	S.S.	RATING
INFORMATION	1 1 (57 58)	2 (59)
SIMILARITIES	1 2 (60 61)	1 (62)

STUDENT NUMBER 41

LEARNING DISABILITY CLINIC

AUBURN UNIVERSITY AT MONTGOMERY, AL

ABILITY	INDICATOR(S) OF A POSSIBLE WEAKNESS (WHERE FOUND)		INDICATOR(S) OF A POSSIBLE STRENGTH (WHERE FOUND)		CONFLICT PRESENT
AUDITORY DISCRIMINATION	ITPA AUDITORY MEMORY	S	ITPA SOUND BLENDING	S	
	WISC-R DIGIT SPAN	S			
	PEABODY PVT	S			
	WOODCOCK READING WORD ATTACK	S			
	KEY MATH MISSING ELEMENTS	S			
			KEY MATH MEASUREMENT	S	YES
VISUAL DISCRIMINATION			WISC-R BLOCK DESIGN	P	
			WISC-R OBJECT ASSEMBLY	P	
	KEY MATH GEOMETRY AND SYMBOLS	P			
	ITPA VISUAL ASSOCIATION	S			
			WISC-R SIMILARITIES	S	
			WISC-R PICTURE COMPLETION	S	
	WISC-R PICTURE ARRANGEMENT	S			
	PEABODY PVT	S			
			WOODCOCK READING LETTER IDENTIFICATION	S	
	WOODCOCK READING WORD IDENTIFICATION	S			
	WOODCOCK READING WORD ATTACK	S			
	WOODCOCK READING WORD COMPREHENSION	S			
	WOODCOCK READING PASSAGE COMPREHENSION	S			
			KEY MATH ADDITION	S	
			KEY MATH SUBTRACTION	S	
	KEY MATH MULTIPLICATION	S			
			KEY MATH DIVISION	S	
	KEY MATH NUMERICAL REASONING	S			
	KEY MATH MISSING ELEMENTS	S			
			KEY MATH MONEY	S	
			KEY MATH MEASUREMENT	S	YES
AUDITORY MEMORY SHORT TERM	ITPA AUDITORY MEMORY	P			
			ITPA SOUND BLENDING	P	
	WISC-R DIGIT SPAN	P			
			WISC-R SIMILARITIES	S	
			WISC-R ARITHMETIC	S	
	PEABODY PVT	S			
	KEY MATH GEOMETRY AND SYMBOLS	S			
	KEY MATH MISSING ELEMENTS	S			

LEARNING DISABILITY CLINIC
AUBURN UNIVERSITY AT MONTGOMERY
LARRY L. MARTIN, PH.D., DIRECTOR

STUDENT 41 GRADE 1

***VISUAL MEMORY SHORT TERM ***

DEFINITION THE ABILITY OF A STUDENT TO REMEMBER VISUAL STIMULI FOR IMMEDIATE RECALL.

WHAT DOES IT AFFECT THE STUDENT MAY HAVE DIFFICULTY LEARNING TO SPELL AND READ. THE STUDENT MAY HAVE DIFFICULTY COMPLETING CLASS NOTES WRITTEN ON THE BOARD IF THEY ARE REMOVED BEFORE THE STUDENT FINISHES COPYING THEM. THE STUDENT MAY FORGET WHERE S/HE HAS JUST PUT THINGS.

GENERAL LEARNING APPROACH USE AN AUDITORY, TACTILE/KINESTHETIC, AND VISUAL APPROACH. GRADUALLY ELIMINATE ALL INPUT MODALITIES EXCEPT VISUAL. FREQUENTLY REVIEW DESIRED MATERIAL AND TEACH TO OVERLEARN.

1 ASK THE CHILD TO LOOK CAREFULLY AT A CLASSMATE AND TO REMEMBER WHAT S/HE IS WEARING. HAVE THE CHILD THEN CLOSE HIS/HER EYES OR TURN HIS/HER BACK AND DESCRIBE WHAT THE CLASSMATE IS WEARING.

2 PLACE 1-10 ITEMS IN A BOX AND THEN TAKE THEM OUT ONE AT A TIME. HOLD EACH ITEM UP FOR A FEW SECONDS, REPLACE IT IN THE BOX, AND ASK THE STUDENT TO LIST THE OBJECTS SHOWN.

FOR MORE INFORMATION SEE BIBLIOGRAPHY, SOURCES NUMBERED 5, 17 AND 21.

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